

**What is claimed is:**

1. A film-forming composition comprising:
  - a) iota carrageenan in an amount of from about 1% to about 15% by weight of the composition;
  - b) kappa carrageenan;
  - c) a bulking agent, wherein the ratio of bulking agent to the combined total of iota and kappa carrageenan is from about 1:1 to about 20:1;
  - d) a plasticizer in an amount of from about 10% to about 50% by weight of the composition; and
  - e) water.
2. The composition of claim 1 wherein the water is distilled.
3. The composition of claim 1, wherein the water is purified.
4. The composition of claim 1, wherein the kappa carrageenan is present in an amount of less than or equal to about 50% by weight of total carrageenan in the composition.
5. The composition of claim 1, wherein the kappa carrageenan is present in an amount of less than or equal to about 100% by weight of iota carrageenan present in the composition, and wherein the total amount of all carrageenan is less than or equal to about 20% by weight of the composition.
6. The composition of claim 1, wherein the kappa carrageenan is present in an amount of from about 0.1% to about 15% by weight of the composition.
7. The composition of claim 1, wherein the kappa carrageenan is present in an amount of from about 0.5% to about 7.5% by weight of the composition.

- 2023-07-06 10:50:04
8. The composition of claim 1, wherein the iota carrageenan is present in an amount of between about 2.3% and about 10.0% by weight of the composition.
  9. The composition of claim 1, wherein the total amount of all carrageenan is less than or equal to about 20% by weight of the composition.
  10. The composition of claim 1, wherein the total amount of all carrageenan is less than or equal to about 10% by weight of the composition.
  11. The composition of claim 1, wherein the ratio of bulking agent to total carrageenan is from about 2:1 to about 15:1.
  12. The composition of claim 1, wherein the water is present in an amount of from about 10% to about 90% by weight of the composition.
  13. The composition of claim 1, wherein the bulking agent is a modified starch.
  14. The composition of claim 1, wherein the bulking agent is an esterified starch.
  15. The composition of claim 1 wherein the plasticizer is selected from the group consisting of sorbitol, non-crystallizing sorbitol, maltitol, glycerin, polyethylene glycol, and combinations thereof.
  16. The composition of claim 1, wherein the viscosity is from about 100 cP to about 1200 cP.
  17. A wet ribbon comprising the film-forming composition of claim 1.
  18. A dry ribbon comprising the film-forming composition of claim 1, having a moisture content of between about 5% and about 20%.
  19. The dry ribbon of claim 18, wherein the tensile strength at rupture is between about 5 N and about 40 N.

20. The dry ribbon of claim 18, wherein the extensibility at rupture is from about 20 mm to about 80 mm.
21. The dry ribbon of claim 18, wherein the solids content is from about 80% to about 95% by weight of the dry ribbon.
22. A capsule made with the wet ribbon of claim 17.
23. A capsule made with the dry ribbon of claim 18.
24. A film-forming composition comprising:
- a) iota carrageenan in an amount of from about 1% to about 15% by weight of the composition;
  - b) kappa carrageenan;
  - c) a bulking agent in an amount of from about 10% to about 60% by weight of the composition;
  - d) a plasticizer in an amount of from about 10% to about 50% by weight of the composition; and
  - e) water.
25. The composition of claim 24, wherein the kappa carrageenan is present in an amount of less than or equal to about 50% by weight of total carrageenan present in the composition.
26. The composition of claim 24, wherein the kappa carrageenan is present in an amount of less than or equal to about 100% by weight of iota carrageenan present in the composition, and wherein the total amount of all carrageenan is less than or equal to about 20% by weight of the composition.

27. The composition of claim 24, wherein the kappa carrageenan is present in an amount of from about 0.1% to about 15% by weight of the composition.
28. The composition of claim 24, wherein the kappa carrageenan is present in an amount of from about 0.5% to about 7.5% by weight of the composition.
29. The composition of claim 24, wherein the water is present in an amount of from about 10% to about 90% by weight of the composition.
30. The composition of claim 24, wherein the iota carrageenan is present in an amount of from about 2.3% to about 10% by weight of the composition.
31. The composition of claim 24, wherein the total amount of all carrageenan is less than or equal to about 20% by weight of the composition.
32. The composition of claim 24, wherein the total amount of all carrageenan is less than or equal to about 10% by weight of the composition.
33. The composition of claim 24, wherein the bulking agent is a modified starch.
34. The composition of claim 24, wherein the bulking agent is an esterified starch.
35. The composition of claim 24, wherein the plasticizer is selected from the group consisting of sorbitol, non-crystallizing sorbitol, maltitol, glycerin, polyethylene glycol, and combinations thereof.
36. The composition of claim 24, wherein the water is distilled.
37. The composition of claim 24, wherein the water is purified.
38. The composition of claim 24, wherein the viscosity is from about 100 cP to about 1200 cP.
39. A wet ribbon comprising the film-forming composition of claim 24.

40. A dry ribbon comprising the film-forming composition of claim 24, having a moisture content of between about 5% and about 20%.
41. The dry ribbon of claim 40, wherein the solids content is between about 80% and about 95% by weight of the dry ribbon.
42. The dry ribbon of claim 40, wherein the tensile strength at rupture is between about 5 N and about 40 N.
43. The dry ribbon of claim 40, wherein the extensibility at rupture is from about 20 mm to about 80 mm.
44. A capsule made with the wet ribbon of claim 39.
45. A capsule made with the dry ribbon of claim 40.
46. A method for preparing a film-forming composition comprising:
- mixing iota carrageenan in an amount of from about 1% to about 15% by weight of the composition, kappa carrageenan and a bulking agent in a ratio of bulking agent to total carrageenan of from about 1:1 to about 20:1 to form a dry mixture;
  - adding a plasticizer to the dry mixture;
  - adding water to the dry mixture to form a dispersion; and
  - heating and mixing the composition to form a uniform dispersion.
47. The method of claim 46, wherein heating the composition comprises heating to a temperature of from about 85°C to about 95°C.
48. The method of claim 46, further comprising heating the water before adding to the dry mixture.
49. The method of claim 46, further comprising casting the uniform dispersion to form a ribbon.

50. The method of claim 49, further comprising feeding the ribbon into a rotary die encapsulation machine.
51. The method of claim 49, further comprising drying the ribbon to a moisture content of from about 5% to about 20%.
52. The method of claim 51, further comprising feeding the dried ribbon into a rotary die encapsulation machine.
53. The method of claim 46, further comprising extruding the uniform dispersion.
54. The method of claim 53, wherein the extruded uniform dispersion is in the shape of a film, ribbon, sheet or tube.
55. The method of claim 54, further comprising feeding the extruded uniform dispersion into a rotary die encapsulation machine.
56. A capsule formed with the ribbon of claim 49.
57. A capsule formed with the ribbon of claim 51.
58. A capsule formed with the extruded uniform dispersion of claim 54.
59. A capsule formed by the method of claim 50.
60. A capsule formed by the method of claim 52.
61. A capsule formed by the method of claim 55.
62. A method for preparing a film-forming composition comprising:
- mixing iota carrageenan in an amount of from about 1% to about 15% by weight of the composition, kappa carrageenan and a bulking agent in a ratio of bulking agent to total carrageenan of from about 1:1 to about 20:1 to form a dry mixture;
  - mixing a plasticizer and water to form a liquid mixture;
  - heating the liquid mixture to a temperature of from about 75°C to about 90°C;

- d) adding the dry mixture to the heated mixture with stirring to form a dispersion;  
and  
e) heating the dispersion with stirring to a temperature of from about 85°C to about 95°C to form a uniform dispersion.
63. The method of claim 62, further comprising casting a ribbon with the uniform dispersion.
64. The method of claim 63, further comprising feeding the ribbon into a rotary die encapsulation machine.
65. The method of claim 63, further comprising drying the ribbon to a moisture content of from about 5% to about 20%.
66. The method of claim 65, further comprising feeding the dried ribbon into a rotary die encapsulation machine.
67. The method of claim 62, further comprising extruding the uniform dispersion.
68. The method of claim 67, wherein the extruded uniform dispersion is in the shape of a film, ribbon, sheet or tube.
69. The method of claim 68, further comprising feeding the extruded uniform dispersion into a rotary die encapsulation machine.
70. A capsule formed with the ribbon of claim 63.
71. A capsule formed with the ribbon of claim 65.
72. A capsule formed with the extruded uniform dispersion of claim 68.
73. A capsule formed by the method of claim 64.
74. A capsule formed by the method of claim 66.
75. A capsule formed by the method of claim 69.

76. A method for preparing a film-forming composition comprising:
- adding a mixture of iota carrageenan in an amount of from about 1% to about 15% by weight of the composition, kappa carrageenan, a bulking agent in a ratio of bulking agent to total carrageenan of from about 1:1 to about 20:1, a plasticizer and water to an extruder;
  - forming a uniform dispersion of the mixture.
77. The method of claim 76, wherein the mixture of iota carrageenan, kappa carrageenan, bulking agent, plasticizer and water are pre-mixed.
78. The method of claim 76, wherein the mixture of iota carrageenan, kappa carrageenan, bulking agent, plasticizer and water are added to the extruder in the form of a dry mix and a liquid mix, wherein the dry mix comprises iota carrageenan, kappa carrageenan and bulking agent, and the liquid mix comprises water and plasticizer.
79. The method of claim 76, further comprising extruding the uniform dispersion.
80. The method of claim 79, wherein the extruded uniform dispersion is in the shape of a film, ribbon, sheet or tube.
81. The method of claim 80, further comprising feeding the extruded uniform dispersion into a rotary die encapsulation machine.
82. A capsule formed by the method of claim 81.
83. A capsule formed with the extruded uniform dispersion of claim 80.
84. A ribbon comprising iota carrageenan, kappa carrageenan, a bulking agent, a plasticizer and water, having a moisture content of between about 5% and about 20%, a tensile strength at rupture between about 5 N and about 40 N, an extensibility at

rupture from about 20 mm to about 80 mm, and a viscosity from about 100 cP to about 1200 cP.

85. A capsule made with the ribbon of claim 84.